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ABSTRACT

This paper contains two stories that highlight a high school science teacher's search for common ground with four students. "Common ground" is a metaphor for shared experiences among teachers and students. The purpose of this qualitative research was to examine: (1) What knowledge, teaching, and learning evolve from the classroom experiences of the teacher and students? (2) What classroom experiences achieve common ground between the teacher and students? and (3) What kinds of classroom experiences could be used to maximize student learning? The first story is an excursion lesson in a year 12 marine studies class where students engage in boat handling skills. The second story takes place in a traditional classroom setting where one student struggles to find relevance in the course. Implications for this research are that teachers who hold positivistic views of knowledge ought to provide classroom experiences which are authentic to the students; teachers skepticism about curriculum topics may interfere with the development of common ground; and common ground is not a leveling of power between teachers and students, rather it occurs as teachers gain their students' respect, not due to their position but because of their expertise and adeptness in communicating with students. Appendices include data collection instruments. Contains 12 references. (Author/JRH)

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CLASSROOM STORIES ABOUT KNOWLEDGE, TEACHING, LEARNING, AND COMMON GROUND

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Paper presented at the First Annual Qualitative Methodology Conference
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ABSTRACT

This paper contains two stories which highlight a high school science teacher's search for common ground with four students. Common ground is a metaphor for shared experiences among teachers and students. The purpose of this qualitative research is to examine the following questions: (a) What knowledge, teaching, and learning evolve from the classroom experiences of the teacher and students? (b) What classroom experiences achieve common ground between the teacher and students? and (c) What kinds of classroom experiences could be used to maximize student learning? The first story is an excursion lesson in a year 12 marine studies class. Students engage in boat handling skills to prepare for a boating license. The second story takes place in a traditional classroom setting where one student struggles to find relevance in the course. Implications of this research are (a) teachers who hold positivistic views of knowledge ought to provide classroom experiences which are authentic to the students; (b) teachers skepticism about curriculum topics may interfere with the development of common ground; and (c) common ground is not a leveling of the power between teachers and students, rather it occurs as teachers gain students' respect not due to their position but because of their expertise and adeptness in communicating with students.

Introduction

The award winning novel *Remembering Babylon* (Malouf, 1993) portrays race and ethnic tensions in nineteenth century Australia. In the novel, loosely based on actual events, a shipwrecked British sailor who had miraculously survived for 17 years with the Aborigines faces humiliation, intimidation, isolation, and physical abuse after stumbling into a pioneer settlement on the northeast coast of Queensland. By the time of his re-introduction to a Euro-Australian community, he has become enculturated into the customs, taboos, and myths of the Aborigines. Many settlers fear the stranger because he appears to have transformed physically, psychologically, and emotionally into an Aborigine whom the whites mistrusted.

After a year in the settlement, the stranger runs away because he believes his life energy is being drained by living in a small hut among the anxious settlers. The stranger and settlers can not reconcile their differences; they can not find common ground. Had the settlers embraced the stranger's deep understanding of the local ecology, they would have learned which plants yielded edible roots and berries, where to gather whistling duck eggs, and how to hunt wallabies and gray kangaroos while avoiding taipans, crocodiles, and other potential dangers.

The story of the shipwrecked sailor offers a lesson on tension between cultures that is similar in some ways to the tension that results from a clash of adolescent and adult subcultures in present day science classrooms. One struggle for secondary science teachers and students is to overcome this tension and learn from one another. Teachers and students can share a landscape, a common ground, by tolerating and accepting each other in a classroom environment that invites diverse ways of knowing while promoting personal and social responsibility.

Purpose

The purpose of this paper is to examine knowledge, teaching, and learning in the context of common ground. In the scope of this paper, common ground is a metaphor that represents the cognitive and affective connections that link members of classroom communities. It relates to the interactions among teachers and students in classrooms. It is a "cultural touchstone" whereby students and teachers share elements and construct identity within a social context (Walker, 1988). It is the sharing of experience where social customs, taboos, and myths provide images that affect an individual's beliefs, values, and attitudes.

In the current era of science education reforms in the U.S. (*National Science Education Standards*, 1996; *Scope, Sequence, Coordination. The Content Core: A Guide for Curriculum Designers*, 1992), understanding how members of classroom communities perceive common ground links to their intentions, motivations, and aspirations. Understanding the concept of common ground offers insights into the roles and goals of classroom participants and their willingness to compromise and modify their own personal goals in light of their larger social

responsibilities. A search for common ground allows students as well as teachers to participate in the reform dialogue (Corbett & Wilson, 1995).

The questions which frame this qualitative inquiry are (a) What knowledge, teaching, and learning evolve from the classroom experiences of the teacher and students? (b) What classroom experiences achieve common ground between the teacher and students? and (c) What kinds of classroom experiences could be used to maximize student learning? Responses to these questions shape the classroom context as constructed by the teacher and students.

Two classroom stories and accompanying interpretations address the first two research questions. Responses to the third question are found in the Implications section that concludes the paper. This research does not recommend a one-size-fits-all form of best teaching practices. Rather it contains authentic descriptions and credible interpretations of classroom practices based on the teacher and students who are in the story. Readers can decide how to best modify their own teaching in light of these classroom stories. The author is hopeful that this paper will prompt reflection and catalyze positive changes.

Theoretical Framework

The overarching goal of this qualitative research is to make sense of the meanings that research participants construct from their experiences in high school science classrooms (Wolcott, 1994; 1995). As a qualitative educational researcher with a relativist ontology and a social constructivist epistemology, the author enters classrooms aware that each individual negotiates personal meanings in social contexts (Tobin & Tippins, 1993). Beliefs, values, and attitudes of teachers and students create the classroom context. Context is based on an individual's tacit and conscious interpretation of the past, perception of the present, and expectation of things to come.

The author set out to create credible and authentic representations of experience by portraying the actions of research participants in the form of classroom stories (Guba & Lincoln, 1989; Clandinin & Connelly, 1991). A story is a means of not only presenting experience but creating it. Readers interpret the meanings of classroom stories based on the verisimilitude they achieve with it. Verisimilitude, or the appearance of truth, is determined by the level of trustworthiness that the reader perceives with the story (Guba & Lincoln). Trustworthiness relates to the degree to which the voices of research participants can be heard in the research text. It relates also to multiple forms of data that inform the research text.

Stories link both cognitive and affective domains of human experience by entertaining and educating simultaneously. People use stories to give meaning to their temporal lives (Carr, 1986). Readers use classroom stories to construct personal meaning which guide their own

present and future teaching practices; they reflect on their stories to make sense of their own prior classroom experiences.

A classroom story may enable the teacher to better understand the diverse perspectives of students. Readers may vicariously enter classrooms and take on the beliefs, values, and attitudes of a teacher or student. Readers may come to view the classroom from a socio-cultural context that is different than their own and in doing so may be able to learn the motivations and intentions of other classroom participants.

Methods

A science teacher in a public high school in Queensland, Australia, allowed the author to be a participant observer in two classes daily for 6 weeks in 1996. Interview transcripts, survey responses, and classroom observation notes guided the stories, interpretations, and implications. The teacher participated in six 30 minute one-to-one semi structured interviews that were audio recorded. Interviews occurred throughout the final three weeks of the observation period. Four of the teacher's students--two students from each class--engaged in a total of 12 thirty minute interviews. All of the names of persons found in this paper are pseudonyms to maintain confidentiality. During interviews, the teacher spoke about professional and personal background, university studies, the highs and lows of teaching, teaching goals and roles, classroom discipline, science instruction, the nature of knowledge, science curricula, staff relationships, and gender and science. The teacher and all of the students from the two observed classes completed a survey instrument that provided a base of information about what had been happening in the classroom before the researcher came onto the scene. Survey responses contained background information to launch the initial interview sessions (a teacher survey can be found in Appendix A and a student survey in Appendix B). After completing the audio recorded interviews, microcassettes were transcribed into text, and the text was analyzed with the aid of the qualitative research program *NUD•IST* (1993). Patterns emerging from the *NUD•IST* index tree created significant themes for the stories.

First Story

The first story, *Man Overboard*, portrays an excursion lesson (field trip) that takes place in the marine studies class. June Fraser, a high school marine studies and multi-strand science teacher, takes her class of 14 marine studies students (11 boys, 3 girls) to the coast each week for a one hour and forty minute double period. Peter and Sandy like the other students in this class are in year 12, the final year of high school. During the other three 40 minute weekly class meetings, June meets with the students in a traditional science classroom at the

high school. Back at the school, students learn the theory behind sailing, power boating, and marine ecology.

The upcoming story focuses on the teacher and two students who take part in a powerboat lesson on man overboard drills. This boating skill is required for a Queensland powerboat driver's license, and it is a topic of the marine studies curriculum. This is the second year that Miss Fraser has taught this group of students since they attend senior high courses for years 11 and 12.

Sandy , a marine studies student, plans on pursing university studies upon graduating from high school. She hopes to achieve a good enough Overall Placement (OP) to be accepted into an elementary education program. Studying boating and sea life has helped her understand the kinds of organisms that inhabit the coastal waters of Queensland. She understands that most academic subjects like maths, English, and other science subjects like chemistry and physics would better prepare her for uni (university), but she has enough flexibility in her course schedule to enroll in a recreational science course like marine studies which is board registered. Sandy's family owns a powerboat, and they often go water skiing on weekends. A powerboat license will enable Sandy to take her father's boat out in the bay with her mates.

Peter, another student, is not going to earn an OP because he has not taken enough board registered subjects in high school. He plans on pursuing an apprenticeship to become a diesel mechanic. His father owns a small outboard powerboat that he and Peter use for fishing. Peter could take the boat out alone if he passes the powerboat driver's license examination.

Man Overboard

June Fraser's right hand pushed the throttle forward causing the 85 horsepower outboard Mercury engine to grumble then roar. The yellow aluminum bow of the *Sea School* rose off the water, and June leaned forward into the head wind. Her left hand gripped the wheel as the 5 meter outboard planed away from the marina containing an assortment of outboard and inboard powerboats and sailboats.

Peter stood next to Miss Fraser who was at the helm. Three students, including Sandy, sat on aft seats and gripped the gunnels. Peter held his cap firmly to his head as he looked through midnight blue sunglasses. Peter's fingers gripped the top edge of the windscreen to keep balance as the boat bounced over the 2-3 foot seas.

After three minutes, June eased the throttle into neutral, instructed Peter to switch places with her, and pointed to a red buoy rocking on the horizon. Peter took the wheel then he pushed the throttle forward hesitantly and the boat moved out. After a few moments, Peter looked at Miss Fraser and asked if he could speed it up. She nodded. Peter pushed the throttle to full and held on.

Miss Fraser turned and motioned for Sandy to throw a spare life vest overboard. Sandy reached down and picked up a faded orange PFD (Personal Flotation Device) from the pounding floor. With one quick flip, the PFD sailed through the air and hit the water. Sandy and the other two students near the stern yelled, "MAN OVERBOARD!" The PFD bobbed in the wake appearing only at the crest of each wave.

Peter heard Sandy yell; he looked over his shoulder and eased back on the throttle. Peter saw Sandy, Miss Fraser, and the other two students pointing toward starboard. Peter turned the wheel starboard. He could see the PFD bobbing in the boat's wake. As the boat approached the PFD, Peter slid the throttle into neutral. The prop stopped. A wake from aft pushed into the transom causing the boat to lurch forward and come alongside the PFD. Sandy reached down over the side and in one smooth motion grabbed hold of it and pulled it aboard.

When the wet PFD hit the floor of the boat, Miss Fraser exclaimed, "Good on ya, Peter. Who's next?"

Sandy stood and walked forward. "I'll go," she said above the gurgling engine. The boat rocked in the waves as Sandy and Peter switched positions on the boat.

Sandy successfully completed the man overboard drill as did the other students who were aboard. Then Miss Fraser steered the boat safely back to the marina. Peter, Sandy, and the other two students climbed onto the floating dock, and a group of 4 students who had been practicing knot tying and radio checks climbed aboard the boat. It was their turn to practice man overboard drills.

Interpretation

Theme: Knowledge is experience.

Miss Fraser believes that knowledge is experience that can be recalled by the mind. Experience is gained though sensory input. Knowledge is gained also through sensor input that leaves a lasting impression on the mind; it is an objectified commodity that can be transmitted. Her epistemology is consistent with positivism. Her view of the external nature of knowledge is consistent with a belief that experience is external to the senses. From her understanding, neither the senses construct experience nor the mind knowledge. According to Miss Fraser, active hands-on experience affect the senses and the mind more profoundly than passive experiences such as sitting and listening to a lecture; therefore, hands-on activities like the powerboat exercises promote knowledge acquisition.

Although the powerboat excursion means additional preparation, coordination, clean up, and responsibility on her part, Miss Fraser prefers that students learn how to operate a powerboat by actually driving it rather than reading a textbook or listening to her lecture about it. When Peter, Sandy, and the other students stand at the helm and bring the *Sea School*

alongside a would be overboard victim, they apply their knowledge of inertia, vectors, velocity, acceleration, and drag. As the boat is brought about, the driver must think and adjust for the wind, waves, and the boat's wake. Students apply these physical science concepts by operating the powerboat in a skillful and safe manner.

Theme: Teaching is passing information and skills.

Miss Fraser believes that teaching is the passing of information. Information becomes knowledge when it is retained by the learner in a mental or kinesthetic form. She believes that teachers inculcate curriculum into the minds of students. The curriculum is senseless information until students engage in meaningful activities as they experience it. Conducting man overboard exercises is part of the formal marine science curriculum. Therefore, Miss Fraser reasons that her role is to model the exercise by giving students opportunities to practice it on their own.

Teaching involves setting an example and providing physical resources for students to engage in meaningful experiences. Learning to safely complete the man overboard activity is a kind of mental and kinesthetic knowledge that students can put into memory like riding a bike or walking. Teachers can inculcate knot tying and radio communications into the students by modeling it and coaching students until they get it right.

According to Peter and Sandy, teachers, textbooks, and other classroom documents are containers of information that ought to be taught by the teacher. Like their teacher, these students hold a positivistic view of knowledge. The teacher and the textbook are experts who pass down their knowledge. Students learn what is contained in the mind of a teacher or the pages of a textbook. But each student has a different sense or impression of knowledge because of his or her own individual experiences even within the same classroom.

Theme: Learning happens for motivated learners.

Miss Fraser believes that students must be motivated to learn. Student motivation connects with the goals and interests of students. Student goals and interests are derived from students' ambitions for the future and their interests and hobbies both in and out of school. In the marine studies class, Peter and Sandy are motivated to learn about boating because it connects with their out-of-school experiences. Peter plans on obtaining a boating license because he wants to be able to drive his father's motor boat for fishing. Sandy enjoys water skiing on her father's powerboat. She wants to become a proficient boat operator. Field excursions in the marine science class are helping her reach this goal.

Theme: Marine studies is a recreational form of science.

Peter and Sandy have a sense of exhilaration from the freedom of steering the boat across the pristine bay waters common to this part of the world. They also gain a sense of self respect from being trusted to operate the boat. This science class is recreational because it is enjoyable for learners. Back in the classroom, students learn formal theory related to the operation of a boat, and they apply this theory to operate the boat, identify sea organisms, research shore environments, sail, talk on marine radios, plot navigation routes, and tie knots. Formal theory directly applies to practical skills and content knowledge that is learned in this course.

Theme: Sandy and Peter respect Miss Fraser.

Not only do Sandy and Peter respect Miss Fraser for her official title as the teacher but also for her expertise in handling the powerboat. When the students are in small groups aboard the 5 meter powerboat, they believe that their safety is in her hands. Peter and Sandy become more attentive during the field excursion lesson since they are less sure of their surroundings and their own boating skills. Miss Fraser can model proper boat handling which these students discover takes practice and patience in accomplishing. Ultimately, these two students view the teacher as an expert and as a person they can trust aboard the boat.

Peter and Sandy respect Miss Fraser also for her interpersonal skills. It is easy for them to ask questions of Miss Fraser without fear of being embarrassed by her reply. She often smiles in class whether on the water or back in the formal classroom. And it is not above her to have a good laugh with students. According to Sandy and Peter, Miss Fraser is not above herself: she is willing to laugh at her own mistakes. These two students also believe that Miss Fraser is working hard to help them pass formal assessments like the boat driver's examination. They believe that Miss Fraser wants them to learn.

Second Story

The second story, *Contrasting Views*, is from a year 11 multi-strand science class. This science elective course covers science-technology-society issues such as energy: its production, use, and environmental impacts. The course covers the content and process of technical hobbies such as photography, horticulture, and life skills such as food preparation and storage. At the time of the story, the class is in the first semester of the two year course.

In this story, Miss Fraser has trouble connecting with students because of their disinterest in learning the multi-strand curriculum. She has had to struggle to make the lessons and practicals (pracs) interesting for the students. In most cases, the students have not enjoyed the activities, excursions, or practicals.

Helen and John are two characters based on the year 11 students in the class. Helen hopes to either work, attend Technical and Further Education (TAFE), or join the army after graduating from high school. John plans on joining a military police unit in the army. He describes himself as having limited intelligence.

Contrasting Views,

"Aughhhh, do we have another lessons on food preparation?" moaned Helen with a sad grin.

Miss Fraser replied, "Yes. Come on now, it isn't that bad really, is it?" A few of the boys in the back of the room went on that it wasn't bad, but it was boring. Helen nodded in agreement. With an empathetic smile, Miss Fraser said:

> I know this is not the most exciting topic, but we need to get prepared for the upcoming test. So I've made some study sheets for you to work on for this class period. You can work on them by yourselves or with a friend. But I want you to be busy answering the questions because these are good practice problems for the upcoming test, and they'll help you pass. If you have problems, come up and ask. I will be doing some marking at the front desk, but please don't hesitate to ask for help. You can ask another student for help as long as you're quiet. Later in the hour we will review your answers. Now let's get started.

Miss Fraser then walked around the room handing out papers to each student. After making sure that each student had a paper, she sat down at the front demonstration bench and began marking papers.

And that is how another Year 11 multi-strand course began for Miss Fraser and the multi-strand students. It was going to be another long 40 minute period for her and the 19 students in the class. She didn't enjoy teaching the unit on food preparation. It seemed to be better suited for a Travel and Hospitality course. But she had to teach it since the curriculum had been adopted before she began in January. Miss Fraser often told students that she wanted to help them prepare for tests, and that some topics and activities may be more interesting than others, but she must teach all the subjects nonetheless.

Miss Fraser wanted to connect with students by building on their interests. But many of the multi-strand students seemed resistant. Some students would rather talk about *Metallica* or drugs than anything related to the multi-strand curriculum. Miss Fraser tried to breath life into her teaching by developing pracs and field excursions, but many students didn't seem to care. Miss Fraser did not look forward to teaching this same set of multi-strand students next year.

After the initial grumbling about the assignment, the students began to solve questions about bacteria, food spoilage, and food borne illnesses. Miss Fraser had to remind Helen and four other students to keep working 3 times during the first 30 minutes of class. Once Helen was talking about a worksheet problem when Miss Fraser told her to be quiet.

The multi-strand science class was boring for Helen. She talked to her mates to help make the time pass more quickly. She worked at a slow pace on the worksheet problems. She really didn't care about the different kinds of bacteria that spoiled food. This topic was not interesting to her. Completing the worksheets was just something that had to be done if she wanted a good mark. She would usually go for days without doing homework and wait until the night before a test to study. Her studying amounted to cramming facts and information into her head for the test. After tests, she quickly forget nearly everything.

John, a student who sat at the front of the room, worked quietly on the worksheets. He rarely talked during the 40 minute period. On occasion, he would turn to a mate for help with a question. John sometimes asked Miss Fraser to help him with a problem. Students who were chatting and joking in the back of the classroom disrupted John from his work. Miss Fraser would remind the boys in the back to be quiet and get to work. They would be quiet for about 10 minutes then the noise level would rise again as they began to share stories about a heavy metal rock band or a cool car or motorcycle that they had seen recently in town. John didn't mind if the other boys talked just as long as they didn't disturb him from learning. He needed a quiet classroom environment to concentrate. John believed that students must try to learn and listen to the teacher. According to John, Miss Fraser was a good teacher who knew the material, was flexible with the assignments, and controlled the classroom pretty well. He believed further that if some of the students did not want to be in class then they should leave. (Students may elect to leave school after Year 10 in Queensland.)

Miss Fraser knew that there were times when she must be stern with students to keep them on task. A few times she tried to chat with them during class, but they got silly and out of control. She didn't want to repeat those episodes, so she resolved that she would probably not connect with these students; yet she could still teach them. She would not achieve common ground with them since achieving it was a kind of teaching strategy that only worked with students who were motivated to learn the curriculum and mature enough to be able to chat quietly then get back to work. If students were resistant or offensive at times, then the teacher would probably not find a common ground with them. In this class, Miss Fraser took on an authoritarian role, and she did not chat with the students.

Helen felt that Miss Fraser lectured to students to force them to take their science studies serious. Helen didn't like it when Miss Fraser talked down to students like "they were babies." Helen knew that she was too talkative at times. But it was fun to talk with mates

especially in a class that was otherwise boring. She also knew that she must earn good marks in years 11 and 12 but she didn't care enough to change her talkative behavior. Listening to the teacher and being perceived as a teacher's pet would isolate her from her mates. She would rather be defiant and possibly even chat back under her breath and risk punishment. She did in fact have her seat moved for part of the first term for being too chatty.

Helen thought that the multi-strand science class was boring. Miss Fraser was an all right teacher but the subject was dull. She couldn't get interested in the food preparation topic. The worksheets and even the film on bacteria in food was boring. Earlier in the year, even the field excursion to the photo lab in town was boring. Helen would rather have spent time at the beach taking pictures of the surf and rocky coast. She would like to experiment with light and motion by taking pictures of waves or use an underwater camera to photograph fish over the reef. The horticulture unit had been boring too. The excursion into the agriculture block was OK but it was boring just digging in the dirt.

John didn't think that the class was boring, but it wasn't fun either. It was a class that he wanted to work hard in to get a good mark. According to John, students are supposed to work in school, and school is not suppose to be fun. It can be entertaining at times, but a student is supposed to apply himself to try to learn the content , earn high marks, and become prepared for a career after high school.

Theme: Resistance and Compliance

Helen is a resistant learner; John is compliant. Helen perceives herself as a victim who suffers from occasional verbal harassment from the teacher. She likes to socialize with her mates which is one of her classroom goals. However her goal clashes with Miss Fraser's goal of teaching. John tries to complete the worksheets and pracs as told. He either does not have as strong of a desire to socialize during class or he has more self discipline than Helen.

Helen does not like it when Miss Fraser yells at her or other students who are chatting about the subject content. She feels that she or other students are being punished for what they are supposed to be doing. She would like to have more class discussions in which she and other students can voice their opinions on the science subject. When asked about her role and the teachers role in the classroom, Helen claims that Miss Fraser sometimes speaks down to the students from a fence that separates her from the students, yet, at other times, Helen concedes that Miss Fraser addresses students in a respectful manner.

John wishes that Miss Fraser would spend more time quieting the noisy boys who sit in the back of the class. He believes that Miss Fraser is justified in yelling at the boys who act silly and interrupt his learning.

Implications

Maximizing Learning in this context

Since knowledge is constructed from classroom discourse, it is recommended that students, like Helen, have opportunities to voice opinions and suggestions about past and future classroom activities. Contrarily, stifling students like Helen may inadvertently shut them out of the classroom discourse. The challenge for Miss Fraser is to find a common ground where the multi-strand students can feel that they can contribute to the classroom dialogue in a positive way without being coerced. This means that teachers must convince otherwise resistant adolescent learners to take an interest in the subject content. This in turn implies a compromise to design curriculum that is authentic to students' lives. Of course, there is no guarantee that all learners will attempt to learn the subject content even if it is authentic to their lives. An example of having an authentic kind of activity might involve having students preparing food for a picnic at a beach or rock concert. Students could determine which foods and under what conditions foods spoil. Another activity might involve leaving foods, such as items from the school's tuck shop, out overnight then check for bacteria.

In the marine studies class, the course content is important to the students. The marine studies students also have much in common with the teacher since many of them belong to a local football club with the teacher. Miss Fraser is able to achieve common ground with these learners because she shares out-of-school interests, and she has taught them for a longer period of time. Positive out-of-school experiences reinforce the respect that learners grant teachers.

Positivism and Authentic Experiences

The dominant paradigm that thrives in both the marine studies and multi-strand science courses is positivism. The teacher and students believe that knowledge is external to the mind. Although this point of view is contrasted with the social constructivist views of the author, the research supporting one particular epistemology over another may be misguided. What is more salient to Helen's learning is that she be convinced to compromise her wishes for being entertained with the needs of the larger community, i.e. for her to become an informed decision maker and make positive contributions to the community. From a Deweyian perspective, this means convincing Helen that she must apply herself to make sense of classroom experiences. This is an easier task for Peter and Sandy in the marine studies course since they are interested in the marine studies topics and activities. The marine studies curriculum is authentic to their lives.

Common Ground and Teacher Enthusiasm

Science teachers ought to maintain a positive and enthusiastic attitude towards the subject content and the planned lesson since many students will mimic the teacher's attitude. Students may adopt and even exaggerate the teacher's passive or negative attitude toward a curriculum topic or an instructional strategy. Although Miss Fraser's admirable intent is to find common ground with students by expressing empathy for them, she missteps by admitting that some aspects of the multi-strand curriculum are not too interesting. She concedes that she is powerless to transform the multi-strand curriculum in a chain of powerlessness that positions students at the bottom. Accordingly, students must do what the teacher asks just as the teacher must teach what is contained within the adopted curriculum. The teacher's attempt at finding common ground may also fail because many adolescents may not use circular reasoning to understand the teacher's constraints and limitations or they may be inhibited from acknowledging the teacher's views due to peer pressure.

Common ground and power

Common ground is one way to think about power in classrooms. Marine studies students grant Miss Fraser power since she has the expertise to safely operate the powerboat. During the man overboard exercises, Miss Fraser takes on the role of a coach or mentor. This allows for one-to-one teaching where the student is an apprentice. On the water, there is a power differential between the teacher and students, but it is a difference that is constructed upon roles that both teacher and students are comfortable with.

Common ground is not a leveling of the power between teachers and students. Rather, it is the construction of power that students grant teachers based on respect. Helen and John are constrained to acquiesce to the authoritarian power of the teacher in the multi-strand class. Helen rebels against it; John acquiesces. Their different responses to the authoritarian power evolve out of their perceived roles in the classroom. In either the marine studies or multi-strand classes, if students accept the premise that doing what the teacher says will pay off later, then it is likely that they will be more motivated to do what the teacher asks. However, if students are not motivated to learn the subject content nor earn high marks, then they may resist the teacher. Students can chip away at the teacher's authoritarian power by chatting back, delaying studies, and exhibiting an overall resistance toward the curriculum and the teacher.

Like shipwrecked sailors on an uncharted coast, Peter, Sandy, Helen, and John have much to teach teachers about what happens in science classrooms. A potential for common ground exists among adult and adolescent subcultures in high school science classrooms as evident in the marine studies class. But for the potential to be realized in other settings, science teachers must find authentic activities and maintain enthusiasm for the curriculum. Students do

have the power to transform the science classroom into an inhospitable place or into an oasis. Not to listen to the their voices is like driving them off into territories unknown; subsequently, teachers find themselves alone searching for common ground.

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APPENDIX A

TEACHER SURVEY

TEACHER FORM
Science, Inquiry, and Student Behavior Survey
Scott Robinson, Ph.D.
SUNY College at Brockport, New York USA

Your candid responses to these survey questions will help me learn about your science teaching. Carefully consider your response to each item. I look forward to working with you, and I am optimistic that we will learn a great deal from each other during my upcoming visit. Please fill out a survey for each science subject that you teach. Thank you for answering the survey questions.

Name (optional) _____

Subject (optional) _____

Please place a number from 1-7 in front of the following items according to the scale:

1=two or more times per daily lesson
2=daily
3=more often than once per week
4=weekly
5=less often than once per week
6=monthly
7=less often than monthly

IN THIS SCIENCE CLASS:

_____ How often do you lecture for all or nearly all of the lesson?

_____ How often do you have students read and answer textbook related questions or other kinds of paper and pencil seat work for all or nearly all of the lesson?

_____ How often do you combine the following: (1) lecture; (2) have students read and work from their textbooks; and (3) have students do paper and pencil kinds of activities for all or nearly all of the lesson?

_____ How often do you conduct demonstrations?

_____ How often do you have students perform practical activities?

_____ How often would you like to have students do practical activities?

_____ How often do you have students do practical activities where they can be inventive and determine their own independent solutions?

_____ How often do students have a say in what will be studied?

_____ How often do student disruptions interrupt your (1) lecture or (2) textbook instruction or (3) paper and pencil activities?

_____ How often do student disruptions interrupt practical activities?

_____ How often have you canceled or shortened a practical activity because of student misbehavior?

(over please)

Please respond to the following questions in the spaces provided.

1. Describe the kinds of student misbehaviors that you have encountered during the following kinds of teaching . . .

a. lecture _____

_____

_____

_____

_____

b. paper and pencil seat work kinds of activities (to include textbook assignments)

_____

_____

_____

_____

c. hands-on practical activities _____

_____

_____

_____

2. Briefly describe your ideal lesson (include descriptions of what you and the students do and the science content to be taught)_____

_____

_____

_____

3. What kinds of teacher inservice activities would you like to have Dr. Robinson do during his upcoming visit? _____

_____

_____

_____

(Please place a check before one or more of the following items which apply to you.)

_____ I would like to have Dr. Robinson observe my teaching. (Please include your name on the other side.)

_____ In addition to being observed teaching, I would like to become involved in a series of interviews (for a total of about 2 hours) in which Dr. Robinson and I will talk about my teaching. (Please include your name on the other side.)

_____ I am not sure if I want to be observed or interviewed.

_____ I would rather not be observed nor interviewed.

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APPENDIX B

STUDENT SURVEY

STUDENT FORM
Science, Inquiry, and Student Behavior Survey
Scott Robinson, Ph.D.
SUNY College at Brockport, New York USA

This survey does not count for a grade. Your honest responses to these questions will help me (Dr. Robinson) learn about your knowledge of science, teaching, and learning. Please answer the following questions in the blank spaces provided. Thank you for answering this survey.

Your Teacher's Name _____

Science Subject _____

Grade Level: _____

Sex: Male ____ Female____

Your Name (optional) _____

What are your plans after secondary school? Please check the appropriate blank(s) below.

Work ____ Tertiary Education ____ Technical Training ____ Military Service ____

Other (please specify) _____

(over please)

Please place a number from 1-7 in front of the following items according to the scale:

1=two or more times per daily lesson
2=daily
3=more often than once per week
4=weekly
5=less often than once per week
6=monthly
7=less often than monthly

IN THIS SCIENCE CLASS:

_____ How often do you conduct hands-on practical activities in the science classroom?

_____ When you do a practical activity, how often do other students disrupt your learning of science?

_____ How often do other students distract you from learning science when the teacher lectures?

_____ How often do other students distract you from learning science when you read and answer questions from the textbook?

_____ How often do other students distract you from learning science when you view movies, slide presentations, or other audio-visual programs?

_____ How often have you thought that what you learn in science class is important in your life outside of school?

_____ How often do you discuss science concepts with other students during class?

_____ How often do you ask the teacher questions about a science related topic?

_____ How often do you answer the teacher's question about a science related topic?

_____ How often do you use computers to learn science?

_____ How often do you do homework for science class?

_____ How often do you take field trips or do practical activities outside of the science classroom?

Please respond to the following questions in the spaces provided.

1. Describe your ideal science lesson . . .

   What kinds of things would you do during your ideal lesson?

_____

_____

_____

_____

_____

   What kinds of things would the teacher do during your ideal lesson?

_____

_____

_____

_____

_____

2. What science topic is of most interest to you (and why)?

_____

_____

_____

_____

_____

3. Please complete the following unfinished statement.

   In this class, learning science is most like . . . .

_____

_____

_____

_____

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